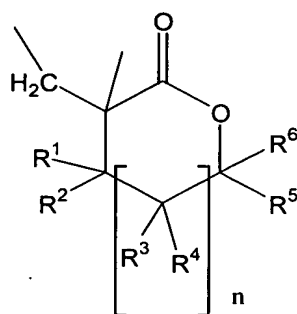


CLAIMS

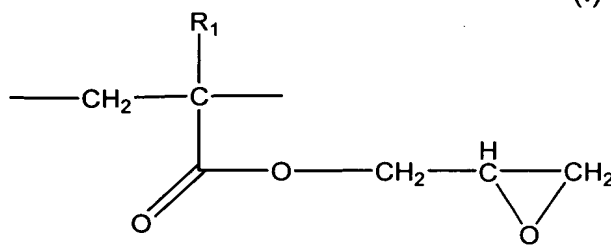
What is claimed is:

1. A copolymer composition comprising:

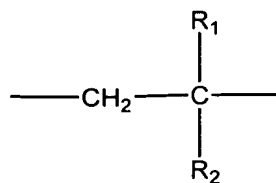
- (a) at least one polymeric repeat unit represented by formula I derived from alpha-methylene lactone monomer,
- (b) at least one polymeric repeat unit represented by formula II derived from glycidyl methacrylate monomer, and
- (c) optionally, at least one polymeric repeat unit represented by formula III derived from a monoethyleneically unsaturated monomer,



(I)



(II)



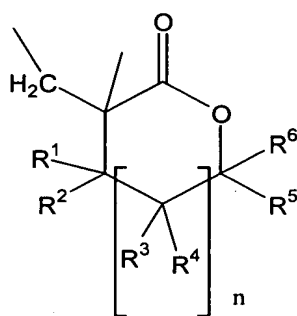
(III)

wherein: n is 0, 1 or 2;

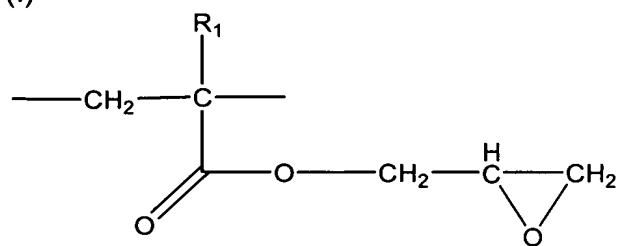
R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, are independently hydrogen, a functional group, hydrocarbyl or substituted hydrocarbyl.

2. A copolymer composition comprising:

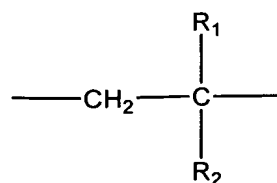
- (a) at least one polymeric repeat unit represented by formula I derived from alpha-methylene lactone monomer,
- (b) at least one polymeric repeat unit represented by formula II derived from glycidyl methacrylate monomer, wherein
- (c) said polymeric repeat unit represented by formula II comprises from about 0.5% to about 45% by weight of the copolymer composition;
- (d) at least one thermoplastic material selected from polyamide or polyester,
- (e) optionally, from 1% to 50% of at least one a polymeric repeat unit represented by formula III derived from a monoethylenically unsaturated monomer, and
- (f) optionally, one or more impact modifier in the range from 0.5% to 35% by total weight of the composition,



(I)



(II)



(III)

wherein: n is 0, 1 or 2;

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, are independently hydrogen, a functional group, hydrocarbyl or substituted hydrocarbyl.

3. The composition of Claim 1 or Claim 2 wherein when n = 0; R<sup>1</sup>,  
5 R<sup>2</sup>, and R<sup>5</sup> are independently hydrogen, and R<sup>6</sup> is methyl.

4. The composition of Claim 1 or Claim 2 wherein the content of the polymeric repeat unit represented by formula II derived from glycidyl methacrylate monomer is from about 0.5% to about 35% of the total composition.

10 5. The composition of Claim 2 wherein the polyamide is selected from polyamide-4, polyamide-6, polyamide-6, 6, polyamide-3,4, polyamide-11, polyamide-12, polyamide-6,10, polyamide-6,12, polyamides prepared from terephthalic acid and 4,4'-diaminocyclohexyl methane, polyamides prepared from azelaic acid, adipic acid and 2,2 bis-(p-  
15 aminocyclohexyl)propane, polyamides prepared from adipic acid and metaxylylene diamine, polyamides from terephthalic acid and trimethyl hexamethylene diamine, and combinations thereof.

6. The composition of Claim 2 wherein the impact modifier is selected from at least one random copolymer, the random copolymer  
20 being selected from the group consisting of branched and straight chain polymers, the polymers being derived from the group consisting of:

- (a) ethylene;
- (b) CO;
- (c) unsaturated monomers selected from the class consisting  
25 of alpha, beta -ethylenically unsaturated carboxylic acids having from 3 to 8 carbon atoms, and derivatives thereof selected from the class consisting of monoesters of alcohols of 1 to 29 carbon atoms and the dicarboxylic acids and anhydrides of the dicarboxylic acids and the  
30 metal salts of the monocarboxylic, dicarboxylic acids and the monoester of the dicarboxylic acid having from 0 to 100 percent of the carboxylic acid groups ionized by neutralization with metal ions;
- (d) unsaturated epoxides of 4 to 11 carbon atoms;
- (e) residues derived by the loss of nitrogen from an aromatic  
35 sulfonyl azide substituted by carboxylic acids taken from the class consisting of monocarboxylic and dicarboxylic acids having from 7 to 12 carbon atoms and derivatives

- 5 thereof taken from the class consisting of monoesters of  
alcohols of 1 to 29 carbon atoms and the dicarboxylic  
acids and anhydrides of the dicarboxylic acids and the  
metal salts of the monocarboxylic, dicarboxylic acids and  
the monoester of the dicarboxylic acid having from 0 to  
100 percent of the carboxylic acid groups ionized by  
neutralization with metal ions;
- 10 (f) unsaturated monomers selected from the class consisting  
of acrylate esters having from 4 to 22 carbon atoms, vinyl  
esters of acids having from 1 to 20 carbon atoms, vinyl  
ethers of 3 to 20 carbon atoms, vinyl and vinylidene  
halides, and nitriles having from 3 to 6 carbon atoms;
- 15 (g) unsaturated monomers having at least one substituent  
selected from the group consisting of pendant  
hydrocarbon chains of 1 to 12 carbon atoms and pendant  
aromatic groups optionally having 1 to 6 substituent  
groups having a total of 14 carbon atoms; and
- 20 (h) unsaturated monomers selected from the class consisting  
of branched, straight chain and cyclic compounds having from 4  
to 14 carbon atoms and at least one additional unsaturated  
carbon-carbon bond capable of being grafted with a monomer  
having at least one reactive group of the type defined in (c), (d)  
or (e).

- 25 7. A method for preparing a copolymer composition, the method  
comprising the steps of:
- (a) contacting at least one alpha methylene lactone monomer  
of formula (I) with a glycidyl methacrylate monomer of  
general formula (II), in an aqueous medium,
- 30 (b) optionally, contacting the product of step (a) with a chain-  
transfer agent and a surfactant,
- (c) contacting the product of step (a) or step (b) with an  
initiator,
- (d) contacting the product of step (c) with a coagulant, to  
obtain the copolymer composition,
- 35 (e) optionally, contacting the product of step (d) with ethyl  
acetate,
- (f) optionally, agitating the product of step (e),
- (g) optionally, filtering the copolymer composition, and

(h) optionally, drying the copolymer composition.

8. The method of Claim 7 wherein the alpha methylene lactone monomer is 5-methyl-alpha-methylene-gamma-butyrolactone.

5 9. The method of Claim 8 wherein the chain transfer agent is 2-ethylhexylthioglycolate, the surfactant is dioctylsulfosuccinate, the initiator is potassium persulfate, and the coagulant is  $\text{MgSO}_4$ .

10. The method of Claim 7 wherein the chain transfer agent is selected from mercaptans, polymercaptans, and polyhalogen compounds.

10 11. The method of Claim 7 wherein the surfactant is selected from alkali metal and ammonium salts of alkyl, aryl, alkaryl, and ara-alkyl sulfonates, sulfates, and polyether sulfates, ethoxylated fatty acids, esters, alcohols, amines, amides, alkyl phenols, complex organo-phosphoric acids, and their alkali metal and ammonium salts

15 12. The method of Claim 7 wherein the initiator is selected from the group consisting of thermal initiators, azo-type initiators, persulfates, peroxydisulfates, and redox-type initiators, wherein the thermal initiators are selected from the group consisting of organo peroxides, acetyl peroxides, lauroyl peroxide, t-butyl peroxide, di-t-butyl hydroperoxide, and peresters; and the redox-type initiators are selected from the group consisting of  
20 hydroperoxide being selected from the group consisting of hydrogen peroxide, t-butyl hydroperoxide, cumene hydroperoxide, and diisopropylbenzene hydroperoxide, and a reducing agent being selected from the group consisting of sodium, potassium, or ammonium bisulfite, metabisulfite, hydrosulfite, sulfur dioxide, hydrazine, ferrous salts,  
25 isoascorbic acid, and sodium formaldehyde sulfoxalate.

13. The method of Claim 7 wherein the coagulant is selected from magnesium sulfate, sodium chloride, calcium chloride.

14. A shaped, molded or extruded article comprising the copolymer composition of Claim 1 or Claim 2.

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